

## **REMARKS**

Reconsideration and withdrawal of the rejections of the application are respectfully requested in view of the above amendments and following remarks.

### **I. STATUS OF THE CLAIMS AND FORMAL MATTERS**

Claims 14-27 are currently pending. Claims 14-27 are rejected. Claim 17 has been canceled without prejudice or disclaimer. Claims 14, 18 and 20 have been amended by this response.

### **II. THE REJECTIONS UNDER 35 U.S.C. § 112**

Claims 14-21 and 25-26 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Claims 14 and 20 have been amended so as to recite an active positive method step and thereby obviate the Examiner's objection.

### **III. THE REJECTIONS UNDER 35 U.S.C. § 103(a)**

Claims 14-27 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent Application Publication No. 2005/0258401 A1 to Lane et al. ("Lane").

The Office Action states that "It is the position of the examiner that it would have been obvious to substitute one alkali metal glycerophosphate for another as one would expect them to have similar properties in the absence of evidence to the contrary. Applicant has not shown that the substitution of lithium glycerophosphate for sodium glycerophosphate of the reference

produces unexpected results.” (Office Action – page 2). Applicants respectfully traverse this assertion.

Applicants respectfully set forth the Specification of the instant application, which clearly states that lithium glycerophosphate has a much greater penetrability into concrete than sodium glycerophosphate (Instant Specification -- page 3, lines 20-21). More specifically, the Specification states:

“It has been found that lithium glycerophosphate has, in addition to a role of inhibiting corrosion of steel rebars held captive in cement-based products, such as concrete and mortar, the ability to protect the concrete from degradation due to alkali reactions and it has a much greater penetrability into concrete than that of the known inhibitors.” (Instant Specification -- page 3, lines 16-22).

The Specification also states:

“This trial demonstrates the capability of lithium glycerophosphate to penetrate a concrete structure. In particular, the penetrability of lithium glycerophosphate was compared during this trial with that of sodium monofluorophosphate. To carry out this trial, laboratory-manufactured mortar slabs were used. The lithium glycerophosphate concentration as a function of depth was measured by ion chromatography assay. FIG. 3 shows the concentration of the products in the slabs as a function of the depth. The results demonstrate the good penetrability of lithium glycerophosphate.” (Instant Specification -- page 8, line 21 - page 9, line 3).

Applicants recently conducted a series of tests to demonstrate that lithium glycerophosphate has a much greater penetrability into concrete than sodium glycerophosphate respectfully. The experimental results of the tests conducted are as follows:

Applicants made a cylindrical piece of concrete of 8 cm diameter and of 15 cm length. This piece was cut into two equal halves along its longitudinal axis.

The respective front surfaces of said halves were first wetted with water and thereafter with aqueous 0.1 molar solutions of lithium glycerophosphate and sodium glycerophosphate, respectively. The solutions were applied onto said front surfaces once every two hours.

The concentrations of lithium glycerophosphate in one half and the concentration of sodium glycerophosphate in the other half were measured after 24 hours at various depths in the concrete. The results are shown below, the depths being expressed in millimeters and the concentrations of the lithium glycerophosphate and sodium glycerophosphate being expressed as a percentage versus the weight of concrete.

<u>Depth</u>	<u>LiGP</u>	<u>NaGP</u>
5	0.811	0.958
10	0.643	0.834
20	0.533	0.417
30	0.201	0.055
40	0.080	<b><u>0.013</u></b>
50	0.019	0.001
60	<b><u>0.009</u></b>	0.000
70	0.001	0.000

In the above table of results, the lowest substantial measurable concentrations have been underlined. It is clear from the above results that sodium glycerophosphate penetrated to a depth of about 40 mm, whereas lithium glycerophosphate penetrated to a depth of about 60mm, which is about 50% deeper.

This shows that the lithium compound is much more appropriate for penetrating a concrete structure and reaching embedded steel rebars than the sodium compound. This result was unexpected before the conception of the invention by the Applicants. It is neither disclosed

by nor is in anyway predictable from the prior made of record. Therefore, Applicants respectfully submit that the present invention is patentable over Lane.

In the office action, claims 14-27 were rejected under 35U.S.C. 103(a) as allegedly being unpatentable over Lane in view of U.S. Patent No. 4,098,614 to Ray ("Ray").

The Office Action states that "Since the secondary reference teaches that it is known to use various alkaline and alkaline earth metal glycerol-phosphates in cement compositions it is position of the examiner that Ray teaches the equivalency of lithium and sodium glycerophosphates." (Office Action -- page 3). Applicants respectfully traverse this assertion.

Specifically, Ray teaches the use of various alkaline and alkaline metal glycerophosphates for improving the compressive strength of concrete. Among these, the salts of calcium, magnesium, potassium and sodium are preferred; with calcium salt being particularly preferred (Ray – col. 3, lines 12-18). Thus, Ray does not teach the equivalency of the lithium and the sodium salts, but the equivalency of magnesium, potassium and sodium salts and the premium ranking position of the calcium salt. In other words, Ray teaches away from the use of lithium salt and urges those skilled in the art to use the calcium salt.

Additionally, Ray teaches the use of the aforesaid salts for obtaining a short-term effect, namely increasing the compressive strength upon setting, whereas the present invention relates to long-term anticorrosion protection of the rebars. Applicants respectfully submit that it is by no means obvious to those of ordinary skill in the art to transpose and apply a teaching concerning the short term strength increase effect to a long-term anticorrosion protection.

The experimental results provided above clearly demonstrate that Li salt and Na salt are not equivalent, and that lithium glycerophosphate has a much greater penetrability into concrete

than sodium glycerophosphate. Neither Lane nor Ray, considered either alone or in combination, teach or suggest the superior penetration ability of the lithium glycerophosphate.

Furthermore, Applicants respectfully submit that the metallic materials disclosed in Ray **are not steel rebars** (Ray – col. 4, lines 43-47). The materials disclosed in Ray are more or less fine or coarse aggregate materials (chips, slag etc.), which serve the same function as stone or gravel material.

As to the case law cited by the Examiner on page 4 of the Office Action, Applicants note that the claimed composition and the claimed process **is not substantially the same** as the compositions and process disclosed in the prior art references, because the cation lithium is not the same as those disclosed in the references and more over since the penetration capability of the claimed composition is much superior to those of the prior art compositions. Therefore, Applicants respectfully submit that the cited case law is not relevant to the present case.

For at least the foregoing reasons, Applicants submit that independent claim 1 is patentable over Lane and Ray, considered either alone or in combination. For similar reasons, independent claims 20 and 22 are also patentable over Lane and Ray.

#### **IV. DEPENDENT CLAIMS**

The other claims in this application are each dependent on an independent claim discussed above, and are therefore believed patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

**V. INFORMATION DISCLOSURE STATEMENT**

The Office Action states that “While it is true that copies are not required if they have been provided by the International Bureau, in this instance copies were not provided by the International Bureau and accordingly the burden is on applicant to provide copies of the references that were not received.” (Office Action -- page 5). Accordingly, Applicants respectfully submit copies of references cited in the International Search Report and enclose a duplicate copy of the Form 1449 so that the Examiner may initial the form to indicate that the references have been considered.

**CONCLUSION**

In view of the foregoing, all of the claims in this application are patentable over the prior art, and an early and favorable consideration thereof is solicited.

Statements appearing above with respect to the disclosures in the cited references represent the present opinions of the Applicants' undersigned attorney and, in the event that the Examiner disagrees with any such opinions, it is respectfully requested that the Examiner specifically indicate those portions of the respective reference providing the basis for a contrary view.

Please charge any fees incurred by reason of this response and not paid herewith to Deposit Account No. 50-0320.

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